3.4_V2.0 AUTONOMOUS POWER-UP PROCEDURE

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Filename: SIPUSCS

BRIEF FUNCTIONAL DESCRIPTION:
This procedure is to turn the ACIS instrument on after an eclipse exit or an EPS anomaly power shutdown and put the instrument into a configuration from which the ground can quickly resume science operations. If the power has been off for a long time, it will take ACIS a long time to get back to a thermal state in which high-quality science observations can be conducted; but if the power outage was short ACIS could be back to normal science observations rather quickly. Therefore, the detector housing heater is turned on first since the detector housing will take the longest to reach its operating temperature. The DPAs and DEA are then turned on and the current focal plane temperature is recorded. The BEP is then warm-booted to start the focal plane temperature regulation using the default system configuration table. This procedure works if the power was completely off or if ACIS was in the memory save mode with the DPA side A left on so that BEP A was always on. This procedure does not assume a particular telemetry format. However, if the spacecraft is configured so that no ACIS science telemetry is received (as *might* be the case in format 5, the likely format after an EPS power anomaly), then all the steps below which required verification using the science telemetry will remain unverified but should be commanded successfully.

The sequence of actions will be:

1. enable and turn on the Detector Housing heater
2. Turn on the DPA sides A and B
3. Turn on the DEA side A, start DEA Housekeeping, get FP temperature
4. Warm boot the BEP, start DEA Housekeeping run
5. Verify ACIS is in the proper state and the temperatures are approaching the nominal values

ASSUMED INSTRUMENT STATE:
Assumes the instrument is powered off or in memory save mode.

SPECIAL INITIAL CONDITIONS:
No telemetry format is assumed; however it would be best to be in format 2 in order to receive the SW TLM verifiers.

OPERATIONAL CONSTRAINTS/CAUTIONS:

REFERENCES:

V1.3

- changed command in steps 3.3 and 4.4 to "XDV0000001" to be consistent with what Royce provided and is actually on the spacecraft
- added SW TLM verifiers
- added step 5 to verify the state of ACIS

V2.0

- ACIS Team signed-off version
- changed version number in "Change History" to 1.3 from 1.2
- changed HW TLM verifier in step 5.4 to "1DEN1BVO"

Table 1: **ACIS Autonomous Power-Up Procedure**

Step #	Title (Revision 3.4_V2.0)	Time Req (s)	Command Description	Command Mnemonic	Telemetry Description	Telemetry Mnemonic	Expected Value	Units
1.0	Turn on DH heater							
1.1	Enable DH heater side B	1.025	Housing Htr En B	1HHTRBEN	DA B ENB/DIS	1DAHTBEN	ENB	
1.2	Turn on DH heater side B	1.025	Housing Htr On B	1HHTRBON	DA B ON/OFF	1DAHTBON	ON	
2.0	Turn on DPA Power Supply							
2.1	Enable DPA PS A	1.025	DPA PS A En	1DPPSAEN				
2.2	Turn on DPA PS A	1.025	DPA PS A On	1DPPSAON	DPA A on	1DPPSA	ON	
2.3	Enable DPA PS B	1.025	DPA PS B En	1DPPSBEN	DPA B Enb	1DPPSBX		
2.4	Turn on DPA PS B	1.025	DPA PS B On	1DPPSBON	DPA B on	1DPPSB	ON	
3.0	Turn on DEA, get FP temp							
3.1	Enable DEA Power A	1.025	DEA PS En. A	1DEPSAEN	DEA ENB/DIS A	1DEPSAX	E	
3.2	DEA Power Supply A On	1.025	DEA PS A On	1DEPSAON	DEA ON/OFF A	1DEPSA	ON	
3.3	Start DEA Hkp run	120	startDEA	XDV0000001				
4.0	Warm Boot							
4.1	set warm boot flag on	1.025	DPA Warm Boot	1WRMBTSB(1)		NONE		
4.2	Halt BEP	1.025	Halt BEP	1RSETIRT(0)		NONE		
4.3	Restart BEP	4.100	Restart BEP	1RSETIRT(1)				
4.4	Start DEA Hkp run	1.025	startDEA	XDV0000001				
5	Verify ACIS is in the proper state when TLM is available.							
5.1	Verify DPA A is on				DPA A On	1DPPSA	ON	
					DPA A Enb	1DPPSAX	ENB	
					DPA +5V	1DPP0AVO	4.9–5.5	V
					DPA Input V	1DP28AVO	28.0–34.0	V
					DPA Input I	1DPICACU	0.35–0.43	A
5.2	Verify DPA PS B is on				DPA B on	1DPPSB	ON	
					DPA +5V	1DPP0BVO	4.9–5.5	V
					DPA Input V	1DP28BVO	28.0–34.0	V
					DPA Input I	1DPICBCU	0.26–0.32	A
5.3	Verify DEA A is On				DEA A ENB/DIS	1DEPSAX	ENB	

Table 2: (CONT) **ACIS Autonomous Power-Up Procedure**

Step #	Telemetry EGSE	Other Verifier	Crit	Description	Notes	RT Con	Tlm Fmt	Min Alt	SIM Pos
1.0									
1.1									
1.2									
2.0									
2.1				No verifier before power is on					
2.2									
2.3									
2.4									
3.0									
3.1									
3.2				DEA A Power should be 21 ± 3 W					
3.3	Check cmdResult == 1 commandEcho 10			start DEA Hkp run from slot 0					
4.0									
4.1									
4.2				1RSETIRT=1 holds board in reset					
4.3				1RSETIRT=0 releases board					
4.4	Check cmdResult == 1 commandEcho 10			start DEA Hkp run from slot 0					
5									
5.1				Expect 12 W for side A, power consumption should be more stable than I or V.					
5.2			2	Expect 9 W for side B, power consumption should be more stable than I or V.					
5.3									

Table 1: **ACIS Autonomous Power-Up Procedure(Page 2)**

Step #	Title (Revision 3.4_V2.0)	Time Req (s)	Command Description	Command Mnemonic	Telemetry Description	Telemetry Mnemonic	Expected Value	Units
					DEA A ENB/DIS	1DEPSA	ON	
					DEA +24 V A	1DEP2AVO	24.0–26.0	V
					DEA +6 V A	1DEP0AVO	5.6–6.7	V
					DEA -6 V A	1DEN0AVO	-7.0– -5.7	V
					DEA +15 V A	1DEP1AVO	15.0–17.0	V
					DEA -15 V A	1DEN1AVO	-17.0– -15.0	V
					DEA +28 V A	1DEP3AVO	>26.0	V
5.4	Verify DEA B is off				DEA Input I B	1DEICBCU	<0.2	A
					DEA +6 V B	1DEP0BVO	0.0 ± 0.2	V
					DEA -6 V B	1DEN0BVO	0.0 ± 0.2	V
					DEA +15 V B	1DEP1BVO	0.0 ± 0.2	V
					DEA -15 V B	1DEN1BVO	0.0 ± 0.2	V
					DEA +24 V B	1DEP2BVO	0.0 ± 0.2	V
					DEA +28 V B	1DEP3BVO	0.0 ± 0.2	V
5.5	Verify DA Htr A is off				DA Htr +28V INPUT A	1DAHHAVO	0.0 ± 0.2	V
					DA Htr Output V A	1DAHAVO	0.0 ± 0.2	V
					DA Htr Current A	1DAHACU	<0.2	A
5.6	Verify DA Htr B is on				DA Htr +28V INPUT B	1DAHHBVO	28.0–32.0	V
					DA Htr Output V B	1DAHBVO	28.0–32.0	V
					DA Htr Current B	1DAHBCU	~ 2.0	A
5.7	Verify BEP A Boot							
5.8	Check HW LEDs				BEP Select	1STAT4ST	0	
					BEP FIFO Not Full	1STAT6ST	1	
					BEP FIFO Not Empty	1STAT7ST	0	

Table 2: (CONT) **ACIS Autonomous Power-Up Procedure(Page 2)**

Step #	Telemetry EGSE	Other Verifier	Crit	Description	Notes	RT Con	Tlm Fmt	Min Alt	SIM Pos
5.4									
5.5									
5.6				values shown are maximum voltage and current which are only obtained while heating up to -60; power drops as steady state is reached.					
5.7	Check bepStartupMessage: bepTickCounter < 10; version =11; watchdogFlag = 0, patchValidFlag =1 warmbootFlag = 1 Check swHousekeeping messages: startingBepTickCounter < 10; endingBepTickCounter= =startingBepTickCounter+640 version =11								
5.8				0 indicates BEP A is selected 1 means FIFO not full 1 means FIFO not empty					

Table 1: **ACIS Autonomous Power-Up Procedure(Page 3)**

Step #	Title (Revision 3.4_V2.0)	Time Req (s)	Command Description	Command Mnemonic	Telemetry Description	Telemetry Mnemonic	Expected Value	Units
5.9	Check SW LEDs				BEP initialization	1STAT3ST	0	
					Watchdog boot	1STAT2ST	1	
					Science run status	1STAT1ST	1	
						1STAT0ST	0or1	
5.10	monitor camera body temp				Camera Body T A	1CBAT	-60	C
					Camera Body T B	1CBBT	-60	C
					Warm Radiator T A	1WRAT	-84	C
					Warm Radiator T B	1WRBT	-84	C
5.11	Monitor FP temp				FP Temp		~ -120	C
	Total Time	135.375						

Table 2: (CONT) **ACIS Autonomous Power-Up Procedure(Page 3)**

Step #	Telemetry EGSE	Other Verifier	Crit	Description	Notes	RT Con	Tlm Fmt	Min Alt	SIM Pos
5.9				0 means BEP SW is running 1 means no watchdog boot 1 means science idle this bit toggles to indicate BEP is running					
5.10				survival is -75.5 C, so temp should be between -75.5 and -60 C Warm radiator temperature will rise as the camera body warms up.					
5.11	deaHousekeepingData			survival is -130 C, so temp should be between -130 C and -120 C					